IN THE SPECIFICATION

Please amend the paragraph beginning at page 5, line 4, as follows:

The solder supplying method according to ~~claim 1~~ a first aspect of the present invention is a method in which solder coating is formed on a metal film through positioning a substrate having the metal film on a surface with the surface facing up in a liquid which is heated to be hotter than a melting point of solder and dropping solder fine particles made of the melted solder on the substrate in the liquid. The "solder" herein is not limited only to the solder for forming solder bumps but also includes solder for die-bonding semiconductor chips and "soft solder" and the like used for, for example, bonding copper pipes. Naturally, it also includes lead-free solder. It is preferable that the "liquid" used herein be an inert liquid which does not react to the solder and a liquid (for example, an organic acid and the like to be described later) which has an effect of removing an oxide film on the surface of the solder. The "solder coating" herein is not limited only to a film type but also includes a hemispherical type and a protrusion type.

Please amend the paragraph beginning at page 7, line 16, as follows:

The solder supplying method according to ~~claim 2~~ a second aspect of the present invention is the method in which the solder fine particles, which are dropped and come in contact with the metal film or the solder coating, are kept for a certain time in that state until solder wet is caused in the solder supplying method ~~according to claim 1~~ the first aspect of the present invention. "A certain time until the solder wet is caused" is the solder wet time described above. Thus, it is possible to surely cause the solder wet by keeping the solder fine particles in contact with the metal film or the solder coating in that state for the solder wet time or longer. The "solder wet" herein is not limited to

forming the solder coating formed on the metal film surface by spread of the solder fine particles reached on the metal film but also includes thickening of the solder coating by spread of the solder fine particles reached on the solder coating.

Please amend the paragraph beginning at page 8, line 7, as follows:

The solder supplying method according to ~~claim 3~~ a third aspect of the present invention is the method in which the solder fine particles to be dropped on the substrate is limited to the ones whose falling speed is within a specific range in the solder supplying method ~~according to clam 1 or 2~~ the first or second aspects of the present invention. As for the solder fine particles in the liquid, the larger ones are faster in the falling speed and the smaller ones are slower in the falling speed. Meanwhile, when the size of the solder fine particles is large, it is likely to generate the solder bridge. When the size of the solder fine particles is small, the surface is easily oxidized. Therefore, by selecting the solder fine particles with the falling speed within a specific range, it enables to suppress the generation of the solder bridges and deterioration of the solder wetability by the oxide film. Specifically, it can be achieved by dropping a large amount of the solder fine particles all at once, and by retreating the substrate or covering the substrate with a shutter at the time when the larger solder fine particles fall in the vicinity of the substrate and when the smaller solder fine particles fall in the vicinity of the substrate so that the solder fine particles do not reach the substrate.

Please amend the paragraph beginning at page 9, line 4, as follows:

The solder bump forming method according to ~~claim 4~~ a fourth aspect of the present invention is the method for forming a solder bump on a pad electrode through:

positioning a substrate having the pad electrode on a surface with the surface facing up in a liquid which is heated to be hotter than a melting point of solder; supplying solder fine particles made of the solder being melted into the liquid; and dropping the solder fine particles on the substrate. The "substrate" herein includes a semiconductor wafer, a wiring board, and the like. Further, the "solder bump" is not limited to the ones of a hemispherical type or a protrusion type but also include a film type.

Please amend the paragraph beginning at page 10, line 17, as follows:

The solder bump forming method according to ~~claim 5~~ a fifth aspect of the present invention is the method in which the solder fine particles are formed by breaking the solder being melted in the liquid in the forming method ~~according to claim 4~~ the fourth aspect of the present inventions. The solder fine particles and the solder bumps are formed in a common liquid so that the forming apparatus can be simplified.

Please amend the paragraph beginning at page 10, line 23, as follows:

The solder bump forming method according to ~~claim 6 or 7~~ another aspect of the present invention is the method in which flux or an organic acid is contained in the liquid or the liquid is made of the organic acid, and the organic acid has a reduction effect which removes an oxide on a metal surface in the forming method ~~according to claim 4 or 5~~ the fourth or fifth aspects of the present invention. By the effect of the flux or the organic acid, the solder wetability in the liquid is more improved. The "flux" herein includes colophony, a surface active agent, a substance (for example, hydrochloric acid) having an effect of removing the oxide film on the solder surface and the like.

Please amend the paragraph beginning at page 11, line 9, as follows:

The solder bump forming method according to ~~claim 8~~ a further aspect of the present invention is the method in which a diameter of the solder fine particle is smaller than a shortest distance between peripheral edges of the pad electrodes adjacent to each other in the forming method according to any one of the above aspects of the present invention ~~claims 4 to 7~~. In this case, the solder fine particles reached respectively on the two adjacent pad electrodes are not to be in contact with each other, so that they are not to be combined for forming the solder bridge.

Please amend the paragraph beginning at page 11, line 17, as follows:

The solder bump forming apparatus according to ~~claim 9 comprises~~ a still further aspect of the present invention may include a liquid tank and a solder fine particle supplying unit ~~means~~. The liquid tank encloses a liquid heated to be hotter than a melting point of solder and a substrate which has pad electrodes on a surface and is positioned in the liquid with the surface facing up. The solder fine particle supplying ~~means~~ unit supplies the solder fine particles made of the solder being melted into the liquid and drops the solder fine particles on the substrate.

Please amend the paragraph beginning at page 12, line 2, as follows:

In the liquid inside the liquid tank, the substrate is immersed with the pad electrode side facing up. At this time, when the solder fine particles are supplied from the solder fine particle supplying ~~means~~ unit into the liquid above the substrate, the solder fine particles naturally fall down by the gravity, thereby reaching on the substrate.

The same effects as those in the forming method according to ~~claim 4~~ the fourth aspect of the present invention can be achieved hereinafter.

Please amend the paragraph beginning at page 12, line 10, as follows:

The solder bump forming apparatus according to ~~claim 10~~ another aspect of the present invention is the apparatus in which the solder fine particle supplying ~~means~~ unit forms the solder fine particles through breaking the solder being melted in the liquid in the forming apparatus ~~claim 9~~. The same effect as those in the forming method according to ~~claim 5~~ the fifth aspect of the present invention can be achieved.

Please amend the paragraph beginning at page 12, line 16, as follows:

The solder bump forming apparatus according to ~~claim 11~~ yet another aspect of the present invention is the apparatus in which the liquid tank and the solder fine particles supplying ~~means~~ unit have the following configurations ~~in the forming apparatus according to claim 10~~. The liquid tank ~~comprises~~ includes a first liquid tank for enclosing the substrate and the liquid and a second liquid tank for enclosing the liquid and the solder being melted and sunk in the liquid. Upper sections of the first liquid tank and the second liquid tank communicate with each other while bottom sections do not. The solder fine particle supplying ~~means~~ unit forms the solder fine particles through breaking the solder being melted in the second liquid tank and supplies the solder fine particles to the first liquid tank from the upper section of the second liquid tank.

Please amend the paragraph beginning at page 14, line 5, as follows:

The solder bump forming apparatus according to ~~claim 12~~ a further aspect of the present invention is the forming apparatus in which the liquid tank and the solder fine particle supplying ~~means~~ unit have the following configurations ~~in the forming apparatus according to claim 10~~. The liquid tank ~~comprises~~ includes: a first liquid tank for enclosing the substrate, the liquid and the solder being melted and sunk in the liquid; and a second liquid tank for enclosing the liquid and the solder being melted and sunk in the liquid. The upper sections and bottom sections of the first liquid tank and the second liquid tank communicate with each other. The solder fine particle supplying ~~means~~ unit forms the solder fine particles through breaking the molten solder in the first liquid tank and the second liquid tank, supplies the solder fine particles to the first liquid tank from the upper section of the second liquid tank, and reutilizes the solder fine particles sunk in a bottom of the first liquid tank as the molten solder.

Please amend the paragraph beginning at page 14, line 21, as follows:

The process for forming the solder bumps by the solder fine particles is the same as the above-described forming apparatus ~~according to claim 11~~. Meanwhile, the solder fine particles which did not form the solder bumps sink in the bottom of the first liquid tank. Then, since the bottom sections of the first liquid tank and the second liquid tank communicate with each other so that the deposited solder fine particles are broken and utilized again as the solder fine particles. Therefore, solder can be effectively utilized.

Please amend the paragraph beginning at page 15, line 6, as follows:

The solder bump forming apparatus according to ~~claim 13 or 14~~ a still further aspect of the present invention is the apparatus in which flux or an organic acid is contained in the liquid or the liquid is made of the organic acid, and the organic acid has a reduction effect which removes an oxide on a metal surface in the forming apparatus according to any one of the above-described aspects of the present invention ~~claims 9 to 12~~. The same effect as those in ~~claim 6 or 7~~ the above-described aspects of the present invention can be achieved.

Please amend the paragraph beginning at page 15, line 13, as follows:

The solder bump forming apparatus according to ~~claim 15~~ another aspect of the present invention is the apparatus in which a diameter of the solder fine particle is smaller than a shortest distance between peripheral edges of the pad electrodes adjacent to each other in the forming apparatus according to any one of the above-described aspects of the present invention ~~claims 9 to 14~~. The same effects as those in ~~claim 8~~ the above-described aspect of the present invention can be achieved.

Please amend the paragraph beginning at page 25, line 8, as follows:

With the solder supplying method ~~(claim 1)~~ according to the present invention, by forming a solder coating on a metal film by dropping solder fine particles on a substrate in a liquid which is heated to be hotter than the melting point of solder, the solder fine particles reached on the metal film can be kept there due to the gravity for the time longer than the solder wet time. Thereby, the solder wetability can be improved. Further, there are not many solder fine particles which are combined to be larger solder particles even if the solder fine particles come in contact with each other in the liquid, so

that it enables to prevent solder bridges and the like from being formed in the metal films with a fine pitch. Furthermore, by changing the supply amount of the solder fine particles, the solder amount in the solder coating can be easily controlled. Moreover, since the solder fine particle is extremely small, a large amount of the solder fine particles are supplied so as to be uniformly dispersed in the liquid. Therefore, the solder amount in the solder coating can be made uniform. As a result, it enables to obtain the metal films with the fine pitch and also enables to obtain the solder coating with a large amount of solder and a less difference in the amount.

Please amend the paragraph beginning at page 26, line 6, as follows:

With the solder supplying method according to at least the second aspect of the present invention, for example ~~claim 2~~, by keeping the solder fine particles which are in contact on the metal film or the solder coating in that state for longer than the solder wet time, it is possible to surely cause the solder wet.

Please amend the paragraph beginning at page 26, line 11, as follows:

With the solder supplying method according to at least the third aspect of the present invention, for example ~~claim 3~~, by dropping on a substrate the solder fine particles which have the falling speed within a specific range, only the solder fine particles in an appropriate size can be used. Therefore, it is possible to suppress generation of the solder bridges and deterioration of the solder wetability due to the oxide film.

Please amend the paragraph beginning at page 26, line 17, as follows:

With the method and the apparatus for forming the solder bumps according to the present invention ~~(claims 4, 9)~~, by forming the solder bumps on the pad electrodes through dropping the solder fine particles on the substrate in the liquid which is heated to be hotter than the melting point of the solder, the solder fine particles reached on the pad electrodes can be kept there due to the gravity for the time longer than the solder wet time. Thereby, the solder wetability can be improved. Further, there are not many solder fine particles which are combined to be larger solder fine particles even if the solder fine particles come in contact with each other in the liquid, so that it enables to prevent solder bridges and the like from being formed in the pad electrodes with a fine pitch. Furthermore, by changing the supply amount of the solder fine particles, the solder amount in the solder bumps can be easily controlled. Moreover, since the solder fine particle is extremely smaller than the pad electrodes, a large amount of the solder fine particles are supplied so as to be uniformly dispersed in the liquid. Therefore, the solder amount in the solder bumps can be made uniform. As a result, it enables to obtain the pad electrodes with a fine pitch and also enables to obtain the solder bumps with a large amount of solder and a less difference in the amount.

Please amend the paragraph beginning at page 27, line 16, as follows:

With the method and the apparatus for forming the solder bumps according to the present invention ~~(claims 5, 10)~~, by forming the solder fine particles through breaking the molten solder in the liquid, the solder fine particles and the solder bumps can be formed in a common liquid. Thereby, the configuration of the forming apparatus can be simplified.

Please amend the paragraph beginning at page 27, line 22, as follows:

In the method and the apparatus for forming the solder bumps according to the present invention ~~(claims 6, 7, 13, 14)~~, flux or the above-described organic acid is contained in the liquid, or the liquid is made of the organic acid, so that the solder wetability in the liquid can be more improved.

Please amend the paragraph beginning at page 28, line 3, as follows:

With the method and the apparatus for forming the solder bumps according to the present invention ~~(claims 8, 15)~~, by making the diameter of the solder fine particle smaller than the shortest distance between the peripheral edges of the adjacent pad electrodes, it enables to avoid the contact between the solder fine particles which reached respectively on the two adjacent electrode pads. Thereby, it is possible to more surely prevent the solder bridges from being formed.

Please amend the paragraph beginning at page 28, line 11, as follows:

In the apparatus for forming the solder bumps according to the present invention, for example ~~claim 11~~, by not connecting the bottom section of the first liquid tank for forming the solder bumps on the substrate and the bottom section of the second liquid tank for forming the solder fine particles, the solder fine particles which did not form the solder bumps are not reutilized. Thereby, it is possible to improve the quality of the solder fine particles and also to make the size of the solder fine particles uniform.

Please amend the paragraph beginning at page 28, line 19, as follows:

In the apparatus for forming the solder bumps according to an aspect of the present invention, for example ~~claim 12~~, by connecting the bottom section of the first liquid tank for forming the solder bumps on the substrate and the bottom section of the second liquid tank for forming the solder fine particles, the solder fine particles which did not form the solder bumps can be reutilized. Thereby, the solder can be effectively utilized without a waste.

Please amend the Abstract beginning at page 34, line 3, as follows:

ABSTRACT

Obtained are fine-pitched pad electrodes and also solder bumps with a large amount of solder and a less difference in the amount. First, in an inert liquid ~~(13)~~ in a liquid tank ~~(11)~~, a substrate ~~(20)~~ is positioned with a surface ~~(21)~~ facing up. Subsequently, the inert liquid ~~(13)~~ containing solder fine particles ~~(14)~~ is fed from a solder fine particle forming unit ~~(15)~~ to the liquid tank ~~(11)~~ and the solder fine particles ~~(14)~~ are dropped from a supply pipe ~~(16)~~ onto the substrate ~~(20)~~ in the inert liquid ~~(13)~~. The solder fine particles ~~(14)~~ naturally fall down by the gravity, thereby reaching the substrate ~~(20)~~. The solder fine particles ~~(14)~~ reached on the pad electrodes on the substrate ~~(20)~~ stay there due to the gravity, and spread on the surfaces of the pad electrodes after the solder wet time, thereby forming solder coating.